

Set of claims

1. A method for ultrasonic measurement of the flow of liquid and/or gaseous media, characterized in that it comprises radiating ultrasonic oscillations downstream or upstream relative to the flow of the medium to be measured, receiving oscillations passed through the medium with conversion into electrical signals, and radiating ultrasonic oscillations upstream or downstream of the measured medium, receiving oscillations passed through the medium with subsequent conversion into electrical signals, analyzing said electrical signals to determine difference in time for passage of ultrasonic oscillations downstream and upstream for calculation of the flow of the medium, wherein at least two reversible electroacoustic transducers are used, each of them having a directional diagram with a beam angle of not less than 60° in different cross section planes and being positioned on a measuring section of a pipeline in such a manner that the axis of the directional diagram is mainly perpendicular to the longitudinal axis of the pipeline, the first reversible electroacoustic transducer is displaced relative to the second downstream at a distance of not more than $2.5 D$, where D is the diameter of the pipeline, wherein said analysis is carried out in respect to electrical signals converted from ultrasonic oscillations passed directly from a transducer to a transducer and/or electrical signals converted from ultrasonic oscillations passed through single and/or multiple reflection from an inner surface of the pipeline.

2. An ultrasonic flowmeter, characterized in that it comprises a block for forming and analyzing electrical pulses, which is electrically coupled to at least two reversible electroacoustic transducers, each of which having a directional diagram for radiation and reception with a beam angle of not less than 60° in cross section planes and being positioned on a measuring section of a pipeline in such a manner that the axis of the directional diagram is mainly perpendicular to the longitudinal axis of the pipeline, the first reversible electroacoustic transducer is displaced relative to the second downstream at a distance of not more than $2.5 D$, where D is the diameter of the pipeline, wherein an external

radiating surface of each reversible electroacoustic transducer is mainly combined with an inner surface of the pipeline.

3. The ultrasonic flowmeter according to claim 2, characterized in that the first and second reversible electroacoustic transducers are positioned on one generatrix of the pipeline with provision for the passage of a pulse of ultrasonic oscillations from one to the other after n -fold reflection, wherein n is an integer up to 20, from the inner surface of the pipeline.

4. The ultrasonic flowmeter according to claim 2, characterized in that the first and second reversible electroacoustic transducers are positioned on different generatrices of the pipeline with provision for the passage of a pulse of ultrasonic oscillations from one to the other directly and/or after m -fold reflection, wherein m is an integer up to 20, from the inner surface of the pipeline.

5. The ultrasonic flowmeter according to claim 2, characterized in that the block for forming and analyzing electrical pulses comprises a controller electrically coupled to at least two channel transceivers, two ADCs, a pulse generator, an indicator and an interface block, wherein the pulse generator is electrically coupled to channel transceivers, each of which is mutually linked to a corresponding ADC and to a corresponding electrical coupling input-output of the block for forming and analyzing electrical pulses with a reversible electroacoustic transducer.